From:	Kelly, Joseph
To:	GCrockford@trcsolutions.com; SMetz@trcsolutions.com; Jason.Smith@tecumseh.com; Victory, Joseph (DEQ)
Subject:	TPC Performance Monitoring during Corrective Measures
Date:	Wednesday, September 13, 2017 1:22:00 PM
Attachments:	Modifications.kmz Soil Vapor Properties Plume North Area.kmz Soil Vapor Properties Plume South Area.kmz New Proposed Monitoring.kmz

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Jason, Graham, and Stacy

Joe Victory and I have discussed the performance monitoring and screening levels for the volatilization to indoor air pathway (VIAP) at the Tecumseh Products Corporation (TPC) site. MDEQ is still assessing TPC's proposed RBCA Model-based, site-specific screening levels for the VIAP. TCE data for the years 2010-2017 indicate highly variable relationships between groundwater data, soil vapor data, and indoor air data at adjacent (or co-located) monitoring points. In addition, long-term trends in some data cannot be evaluated because incomplete data sets by media/location were collected during the characterization stage of the RFI. As a result, we are suggesting that performance monitoring will need to be achieved through a combination of the groundwater sampling, soil gas sampling, co-located indoor air and sub-slab air monitoring, and O&M monitoring we are proposing herein.

As a result of our discussions, we have outlined the following performance monitoring criteria and objectives, which we would like to discuss. I have attached kmz files for viewing in Google Earth.

PERFORMANCE MONITORING

Groundwater Monitoring requirements:

a. Locations - within the entire current plume footprint, at all source areas, and at sentinel points along the projected plume path. (locations added to those proposed in attached Modifications.kmz file)
b. Frequency - Quarterly
c. Duration - dependent on screening levels (TBD) being met continuously, along with source removal.

After reviewing the modifications in the revised 3/6/17 CMP, your proposed locations for groundwater monitoring are much closer to what I had envisioned. In addition to those locations proposed in the 3/6/2017 CMP, EPA requests the inclusion of performance groundwater monitoring at existing wells PRB-01S, PRB-15D, PRB-16S, MW-17S, MW-21, and MW-41, and has identified the need for monitoring at additional depths at locations proposed in the 3/6/2017 CMP to include MW-44D, MW-48D, MW-49D, MW-51 (include both shallow and deep intervals), MW-52 (include both shallow and deep intervals), MW-61D, MW-62 (include both shallow and deep intervals closer to source), MW-XX (shallow, intermediate and deep intervals at SB-80), MW-YY (deep interval, source areas south of MW-33S, installed east of source), and MW-ZZI (intermediate depth along Maumee, between Cummins and Patterson. These are shown on the attached Modifications.kmz file, compared with the locations proposed in the 3/6/16 CMP (New Proposed Monitoring.kmz).

Indoor Air requirements - sampling is the only line of evidence that can confirm a complete VI pathway at a given location:

a. Location –

i. Where an SSDS is in operation (at less frequency than where no SSDS is present)

ii. Where a HVAC or other engineering control is mitigating risk (at less frequency than where no engineering control is present)

iii. Within the 100-ft lateral inclusion zone – At residential or commercial locations where adjacent plume concentrations are at 10x the screening level, a preferential pathway is known to exist, or where a resident requests monitoring (potentially affected locations are shown in the attached Soil Vapor Properties Plume North Area and Soil Vapor Properties Plume South Area kmz files; EPA proposes half of those locations should be sampled).

iv. Ideally co-located with sub-slab soil gas points and/or occupied areas for commercial buildings. Sample each occupied level of building that has potential for exposure.

b. frequency –

i. Conduct annually within the entire current plume footprint, and at sentinel points along the projected plume path

ii. Reduce based on SG/GW detections below MSSLs (default or site-specific) – confirming validation of model(s)

iii. If indoor air detections > ND < RIASLs - Start with quarterly monitoring, frequency is increased to monthly if increasing trends, or post-evacuation (during SSDS Startup)

c. Duration - contingent upon ND results and engineering controls functionality OR source removal

EPA identifies approximately 20 residential properties and 17 commercial/commercial properties within the footprint of the shallow groundwater plume. EPA and MDEQ believe that co-located soil vapor and indoor air sampling should be performed at a representative portion of these properties, with a goal of targeting 50% of the potentially affected locations during remediation.

Soil Gas requirements - sampling should ideally be conducted at sub-slab locations; however, access considerations and other pathways into structures (utilities, etc.) must be considered (additional soil

gas locations proposed in attached Modifications.kmz file).

a. Locations –
    i. Within the entire current plume footprint where receptors are present.
    ii. Where an SSDS is in operation
    iii. Within the 100-ft lateral inclusion zone – At residential or commercial locations adjacent to the source
    iv. Ideally co-located with sub-slab soil gas points and/or occupied areas for commercial buildings. Sample each occupied level of building that has potential for exposure
b. Frequency – Quarterly to semi-annually along with groundwater monitoring in plume footprint interior
c. Duration - contingent upon ND results and engineering controls functionality OR source removal

In addition to those locations proposed in the 3/6/2017 CMP, EPA requests the inclusion of performance soil gas monitoring at existing locations SG-01, SG-02, SG-03R, SG-05, SG-08, SG-13, SG-14R, SG-28. EPA proposes the installation of a new soil gas location (or collocated vapor pin/indoor air location) at SG-XX, at the property where MW-50 is proposed. EPA also requests the potential reinstallation of SG-06R, given that the soil gas results appear inconsistent with groundwater data from this area, to determine if the existing location is isolated from subsurface contamination by a subsurface anomaly.

Engineering Controls – O&M Schedule for HVAC, SSDS, SVE at source, or other control

a. HVAC adjustments (filter changeouts, damper settings changes, etc) – as indoor air concentrations increase, or as needed
b. SSDS operation verification via pressure differential monitoring, stack testing– semi-annually-assuming the plume is decreasing in strength
c. Reduce frequency when pressure differential monitoring consistently shows positive pressure conditions
d. Screening levels consistently met in applicable media

We can discuss these further on Sept 21. If possible, we should begin planning on presenting at the RAT meeting in October, if that works for your schedule.

Regards,

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Remediation and Reuse Branch
U.S. EPA Region 5
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Chicago, Illinois 60604
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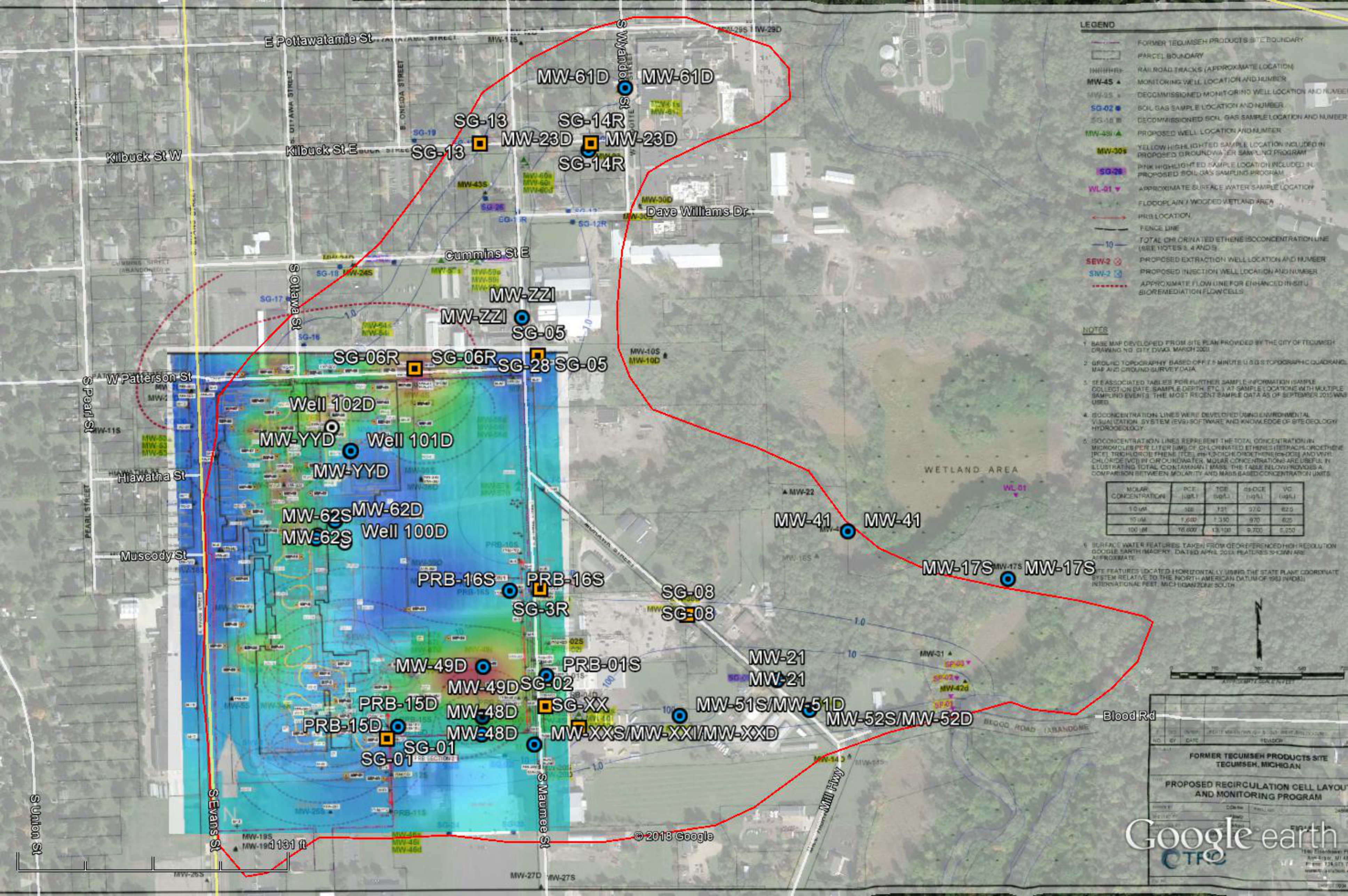
Please note our new mail code is LU-16J


LEGEND
FORMER TECUMSEH PRODUCTS SITE BOUNDARY
PARCEL BOUNDARY
RAILROAD TRACKS (APPROXIMATE LOCATION)
MW-4S MONITORING WELL LOCATION AND NUMBER
DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
SG-02 SOIL GAS SAMPLE LOCATION AND NUMBER
DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
MW-4SI PROPOSED WELL LOCATION AND NUMBER
MW-30S YELLOW HIGHLIGHTED SAMPLE LOCATION INCLUDED IN PROPOSED GROUNDWATER SAMPLING PROGRAM
SG-28 PINK HIGHLIGHTED SAMPLE LOCATION INCLUDED IN PROPOSED SOIL GAS SAMPLING PROGRAM
WL-01 APPROXIMATE SURFACE WATER SAMPLE LOCATION
FLOODPLAIN / WOODED WETLAND AREA
PRB LOCATION
FENCE LINE
10 TOTAL CHLORINATED ETHENE ISOCONCENTRATION LINE (SEE NOTES 3, 4 AND 5)
SEW-2 PROPOSED EXTRACTION WELL LOCATION AND NUMBER
SIW-2 PROPOSED INJECTION WELL LOCATION AND NUMBER
APPROXIMATE FLOW LINE FOR ENHANCED IN-SITU BIOREMEDIATION FLOW CELLS
NOTES
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH DRAWING NO. CITY DWG, MARCH 2003.
2. GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
3. SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.) AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS. THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2010 WAS USED.
4. ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
5. ISOCONCENTRATION LINES REPRESENT THE TOTAL CONCENTRATION IN MICROMOLES PER LITER (uM) OF CHLORINATED ETHENES (TETRACHLOROETHENE [PCE], TRICHLOROETHENE [TCE], cis-1,2-DICHLOROETHENE [cis-DCE], AND VINYL CHLORIDE [VC]) IN GROUNDWATER. MOLAR CONCENTRATIONS ARE USEFUL IN ILLUSTRATING TOTAL CONTAMINANT MASS. THE TABLE BELOW PROVIDES A COMPARISON BETWEEN MOLARITY AND MASS-BASED CONCENTRATION UNITS.
MOLAR CONCENTRATION | PCE (ug/L) | TCE (ug/L) | cis-DCE (ug/L) | VC (ug/L)
1.0 uM | 166 | 131 | 97.0 | 62.5
10 uM | 1,660 | 1,310 | 970 | 625
100 uM | 16,600 | 13,100 | 9,700 | 6,250
6. SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
7. SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83) INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
FORMER TECUMSEH PRODUCTS SITE
TECUMSEH, MICHIGAN
PROPOSED RECIRCULATION CELL LAYOUT AND MONITORING PROGRAM
E Pottawatamie St
Kilbuck St W
Kilbuck St E
Cummins St E
W Patterson St
Hiawatha St
Muscody St
Dave Williams Dr
Blood Rd
S Wyandotte St
S Ottawa St
S Pearl St
S Union St
S Evans St
S Maumee St
Mill Hwy
PEARL STREET
PATTERSON STREET
HIAWATHA STREET
MUSCODY STREET
CUMMINS STREET (ABANDONED)
BLOOD ROAD (ABANDONED)
WETLAND AREA
MW-61D
SG-13
SG-14R
MW-23D
SG-13
SG-14R
MW-43S
MW-30D
SG-12R
MW-ZZI
SG-05
SG-06R
SG-28
Well 102D
MW-YYD
Well 101D
MW-62S
MW-62D
Well 100D
PRB-16S
SG-3R
SG-08
MW-49D
PRB-01S
SG-02
PRB-15D
SG-XX
MW-48D
SG-01
MW-XXS/MW-XXI/MW-XXD
MW-51S/MW-51D
MW-52S/MW-52D
MW-41
MW-17S
MW-21
MW-10S
MW-10D
MW-22
MW-31
MW-42D
WL-01
1.0
10
100
131 ft
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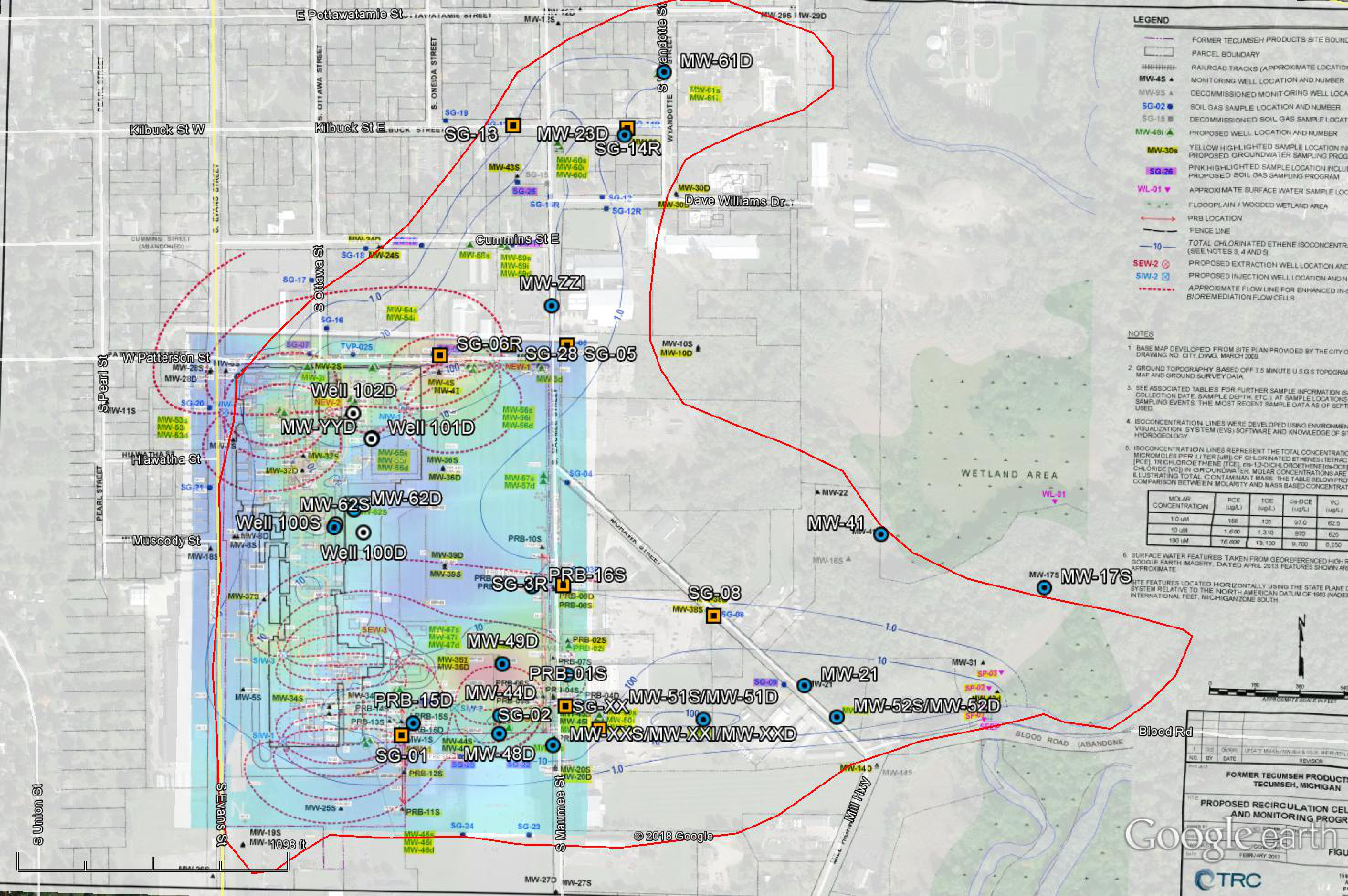
Google earth



LEGEND
FORMER TECUMSEH PRODUCTS SITE BOUNDARY
PARCEL BOUNDARY
RAILROAD TRACKS (APPROXIMATE LOCATION)
MW-4S MONITORING WELL LOCATION AND NUMBER
MW-9S DECOMMISSIONED MONITORING WELL LOCATION
SG-02 SOIL GAS SAMPLE LOCATION AND NUMBER
SG-18 DECOMMISSIONED SOIL GAS SAMPLE LOCATION
MW-48i PROPOSED WELL LOCATION AND NUMBER
MW-30s YELLOW HIGHLIGHTED SAMPLE LOCATION INCLUDED IN PROPOSED GROUNDWATER SAMPLING PROGRAM
SG-26 PINK HIGHLIGHTED SAMPLE LOCATION INCLUDED IN PROPOSED SOIL GAS SAMPLING PROGRAM
WL-01 APPROXIMATE SURFACE WATER SAMPLE LOCATION
FLOODPLAIN / WOODED WETLAND AREA
PRB LOCATION
FENCE LINE
TOTAL CHLORINATED ETHENE ISOCONCENTRATION (SEE NOTES 3, 4 AND 5)
SEW-2 PROPOSED EXTRACTION WELL LOCATION AND NUMBER
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APPROXIMATE SCALE IN FEET
FORMER TECUMSEH PRODUCTS
TECUMSEH, MICHIGAN
PROPOSED RECIRCULATION CELL AND MONITORING PROGRAM
FEBRUARY 2017
TRC
E Pottawatamie St
Kilbuck St W
Kilbuck St E
S Wyandotte St
Dave Williams Dr
Cummins St E
S Ottawa St
W Patterson St
S Pearl St
Hiawatha St
Muscody St
S Maumee St
S Evans St
S Union St
Mill Hwy
Blood Rd
BLOOD ROAD (ABANDONED)
WETLAND AREA
MW-61D
SG-13
MW-23D
SG-14R
MW-ZZI
SG-06R
SG-28
SG-05
Well 102D
MW-YYD
Well 101D
MW-62S
MW-62D
Well 100S
Well 100D
SG-3R
PRB-16S
SG-08
MW-41
MW-17S
MW-49D
PRB-01S
MW-21
MW-44D
SG-XX
MW-51S/MW-51D
MW-52S/MW-52D
PRB-15D
SG-02
MW-XXS/MW-XXI/MW-XXD
SG-01
MW-48D
1098 ft
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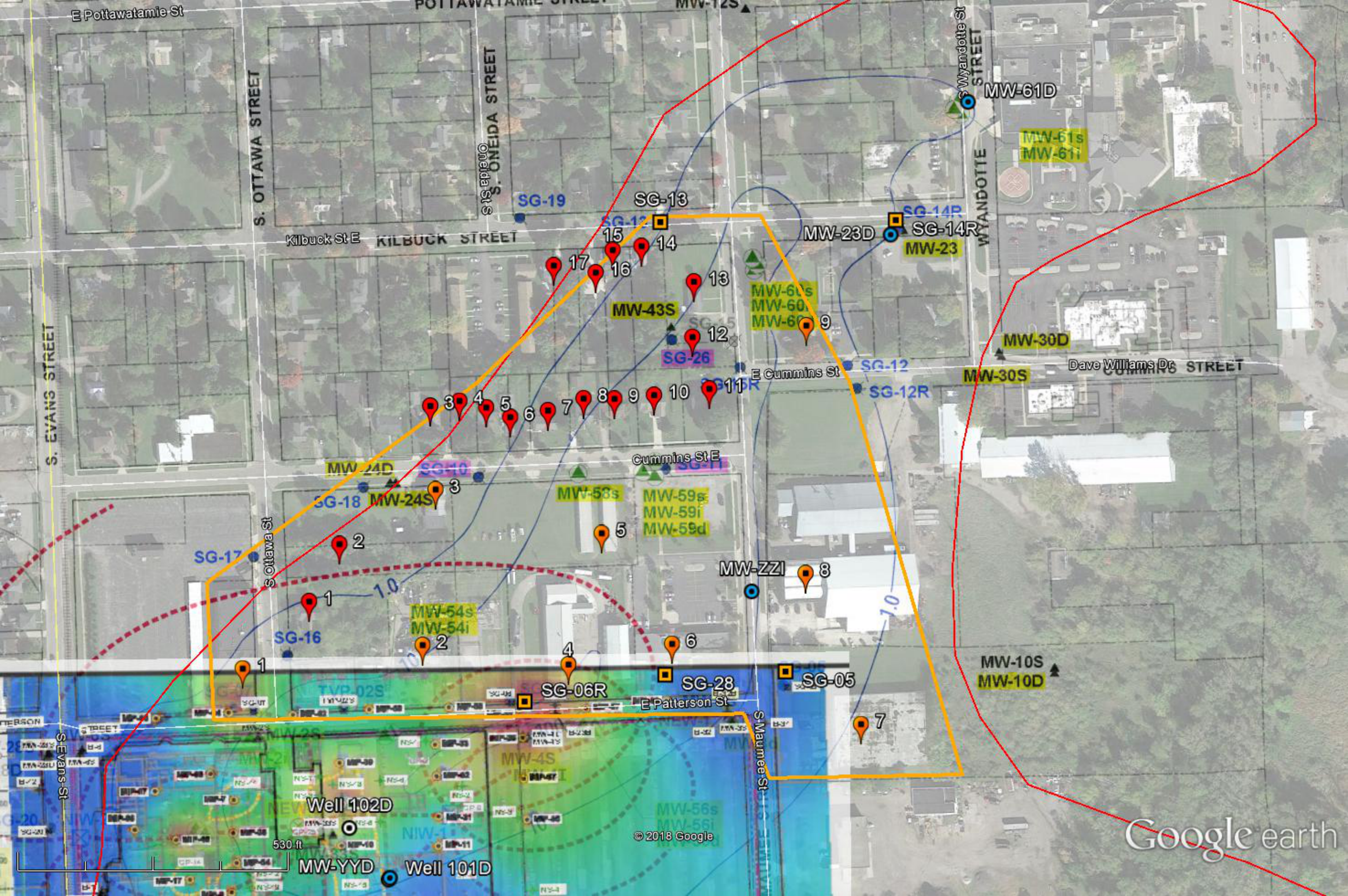
E Pottawatamie St
POTTAWATAMIE STREET
MW-12S
S. OTTAWA STREET
S. ONEIDA STREET
Oneida St S
S Wyandotte St
WYANDOTTE STREET
MW-61D
MW-61s
MW-61i
SG-19
SG-13
Kilbuck St E
KILBUCK STREET
MW-23D
SG-14R
MW-23
15
14
17
16
13
MW-43S
MW-60s
MW-60i
9
12
SG-26
MW-30D
Dave Williams Dr
CUMMINS STREET
MW-30S
E Cummins St
SG-12
SG-12R
11
3
4
5
6
7
8
9
10
S. EVANS STREET
Cummins St E
MW-24D
SG-10
3
SG-18
MW-24S
MW-58s
MW-59s
MW-59i
MW-59d
5
2
SG-17
S Ottawa St
1.0
MW-ZZI
8
1
SG-16
MW-54s
MW-54i
2
6
4
1
SG-06R
SG-28
SG-05
E Patterson St
S Maumee St
7
MW-10S
MW-10D
Well 102D
530 ft
MW-YYD
Well 101D
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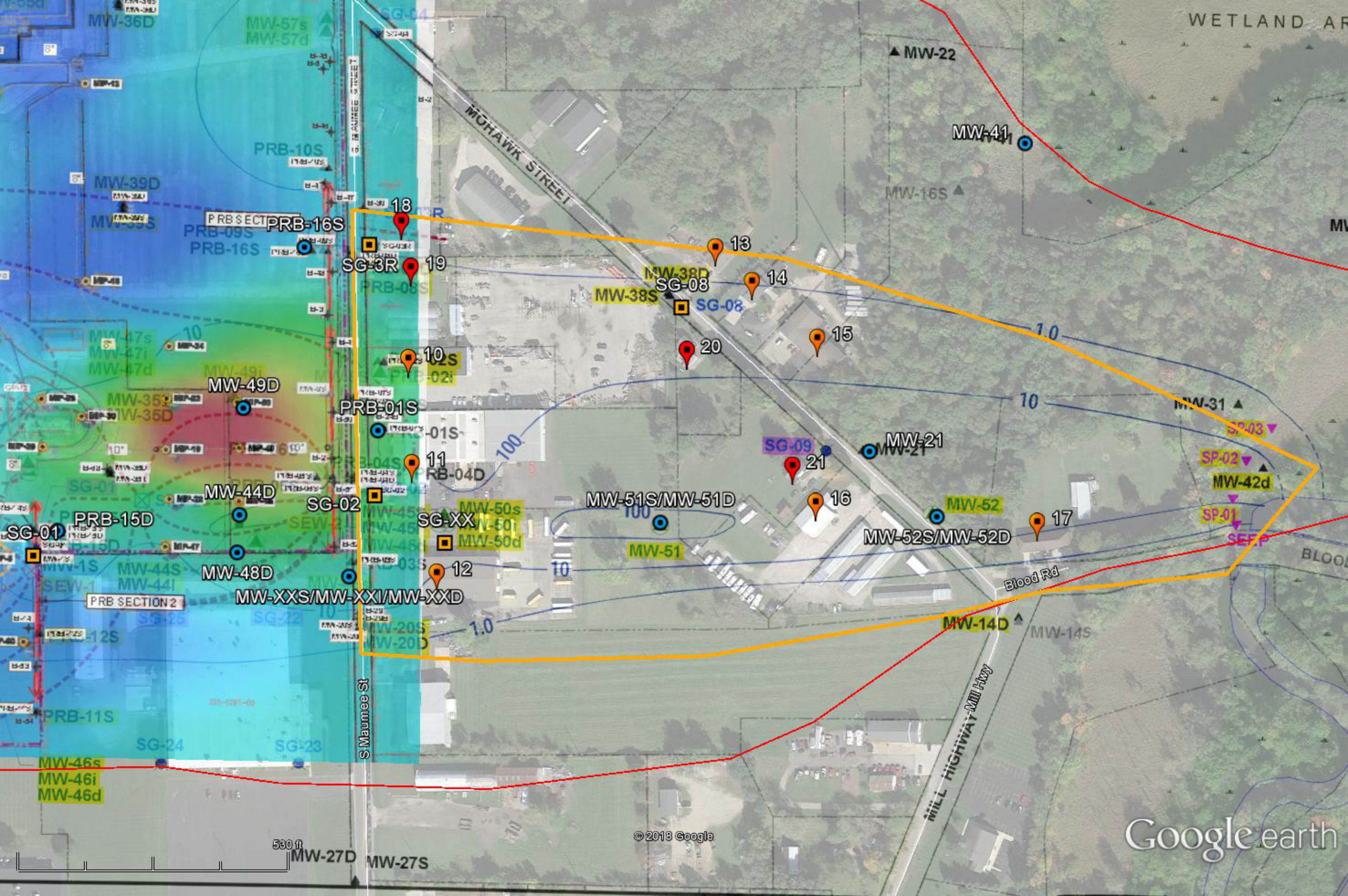
Google earth


MOHAWK STREET
WETLAND AR
MW-22
MW-41
MW-16S
MW-39D
PRB-10S
PRB SECTION 1
PRB-16S
PRB-09S
PRB-16S
18
SG-3R
19
13
MW-38D
SG-08
MW-38S
SG-08
14
15
20
1.0
10
MW-31
SG-03
SP-02
MW-42d
SP-01
SEEP
MW-49D
PRB-01S
10
11
RB-04D
100
MW-44D
SG-02
PRB-15D
SG-01
MW-48D
SG-XX
MW-50s
MW-50i
MW-50d
MW-51S/MW-51D
MW-51
SG-09
21
MW-21
16
MW-52
MW-52S/MW-52D
17
12
MW-XXS/MW-XXI/MW-XXD
PRB SECTION 2
MW-14D
MW-14S
Blood Rd
MILL HIGHWAY-Mill Hwy
S Maumee St
PRB-11S
SG-24
SG-23
MW-46s
MW-46i
MW-46d
530 ft
MW-27D
MW-27S
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